

## **Structures of Capital and Sociotechnical Change: The Case of Tech Startups and Venture Capital**

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This article argues that financing shapes processes of sociotechnical change in profound yet underexamined ways. Drawing on ethnographic fieldwork at two digital technology startups, we show how their dependence on venture capital (VC) influenced how they developed, marketed, and deployed products. Through this examination of VC-funded startups, we aim to make a broader point: Structures of capital should be central to studies of sociotechnical change.

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The subject of sociotechnical change—specifically, how and why it unfolds as it does—has long preoccupied social scientists and communication scholars. While these questions have prompted a panoply of theories and disagreements (Sovacool & Hess, 2017), in recent years the field of science and technology studies (STS) has become a dominant lens through which sociotechnical change is understood, especially with regard to the development and diffusion of digital technologies.

Contemporary STS—and one of its most notable theoretical interventions, Actor-Network Theory (ANT)—emerged as part of the social sciences' "social-constructivist turn" in the 1980s. Rejecting the determinism of evolutionary approaches (e.g., Ziman, 2003), STS scholars argued that science and technological development are contingent, "hewn precariously of the recalcitrant ambiguity of nature, the random contingencies of history, and the exacting disciplines of social negotiation by humankind's imagination, ingenuity, and wit" (Edge, 1995, p. 5). In this framework, social life is best understood as an ever-shifting network of human and nonhuman actors; sociotechnical change occurs when particular configurations of actors encounter one another. As such, much STS scholarship has focused on analyzing these very encounters—between humans, animals, objects, microorganisms, etc. This commitment to tracing microlevel interactions has illuminated a range of complex sociotechnical processes, from sea-scallop conservation efforts (Callon, 1984) to the take-up of digital technologies in newsrooms (Boczkowski, 2004).

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STS's emphasis on materiality, contingency, and agentic action is a necessary corrective to reductive functionalist theories of sociotechnical change. This perspective remains vital, given that deterministic narratives about artificial intelligence (AI), algorithms, and big data abound. Scholars have noted that theories like ANT, which "do not take anything for granted" (Steensen & Westlund, 2021, p. 63), have become particularly popular for analyzing the landscape of networked digital media, with its enduring uncertainty about how interactions between media-makers, production and distribution technologies, material infrastructures, and users play out.

Yet the focus on human/nonhuman encounters has also meant that much STS-inflected scholarship pays comparatively little attention to the structural terrain on which these encounters occur (Benson, 2014; Vandenberghe, 2002). Such analysis is also vital: myriad studies have demonstrated the utility of examining how structural factors—such as occupational standards (Bailey & Leonardi, 2015), systems of patriarchy (D'Ignazio & Klein, 2020), and racial domination (Benjamin, 2019)—can shape processes of sociotechnical change, while managing to elide reductive determinism.

This article aims to continue in this vein. We argue that understanding contemporary sociotechnical change requires attending to the institutions and structures of capital—particularly to the influence of financing—which "overdetermine the form which the assemblage of elements can or cannot take" (Vandenberghe, 2002, p. 61). We are, of course, not alone in this emphasis on political economy: there have been growing efforts in recent years to analyze the rise of AI, algorithms, and digital data as coincident with a shift in the structure of capitalism and processes of capital accumulation (e.g., Srnicek, 2017; Vertesi, Goldstein, Enriquez, Liu, & Miller, 2020; Zuboff, 2018). However, studies of "platform capitalism" typically engage in macro- or mesolevel analyses, rarely examining the concrete organizational processes and interactions through which financial actors' interests come to define the shape of innovation.

We contend that combining STS's attention to microlevel interactions with a broader view of the political-economic context in which those encounters occur can deepen insight into processes of sociotechnical change. The remainder of the article proceeds as follows: first, we explore the major economic shifts that constitute the terrain on which digital sociotechnical change unfolds—namely, financialization and the increased influence of venture capital (VC). Next, we draw on ethnographic fieldwork at two digital technology startups to illustrate how their reliance on VC shaped how technical products were developed and iterated. We conclude with a call for greater attention to structures of capital in studies of sociotechnical change—even among those that focus on microlevel encounters between humans and technological artifacts.

### **Financialization, Shareholder Value, and Venture Capital**

Economic sociologists have examined the financialization of the economy and its far-reaching consequences. Epstein (2005) defines financialization as "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (p. 3). One focus of research has been the rise of the "shareholder value" conception of the firm, which emerged as a response to the corporate crisis of profitability of the 1970s (Fligstein & Goldstein,

2022). Firms are increasingly managed with the goal of maximizing returns to investors, who extract company resources that were previously claimed by other stakeholders.

The rise of financialization is relevant to understanding the digital tech sector. Large, publicly traded tech companies have embraced shareholder-value strategies including outsourcing and staffing cuts, redistributing wealth to investors via stock buybacks and dividend payments, and prioritizing the interests of shareholders over broader social concerns. As large corporations have reduced their investments in research and development, venture-backed startups have played an increasingly important role as a source of innovations (Block & Keller, 2009).

Given the outsized role of VC in financing high-tech innovation, studies of digital technologies can benefit from attending to how financiers use nascent tech companies as investment vehicles. VC investors exchange money for an ownership stake in high-risk, high-growth enterprises. Profits are derived from the sale of their equity stake in the startups they fund. VCs invest knowing that most of the startups in their portfolio will fail but that a small number may yield massive returns via corporate acquisitions or initial public offerings (Mason, 2009). Early-stage tech startups engage in continual technological experimentation to increase key user metrics and demonstrate to investors that they have the potential to deliver windfall profits (Shestakofsky, forthcoming). As startups mature and their workforces professionalize, the relative importance of revenue generation increases; later-stage startups typically go to greater lengths to demonstrate to potential investors that their products can be “monetized,” though producing a profitable product remains secondary to the goal of increasing the company’s valuation in an eventual sale (Kenney & Zysman, 2019; Shestakofsky, forthcoming).

Building on Bailey and Barley (2020), we argue that if we want to better understand and intervene in contemporary processes of sociotechnical change, it is important to center structural forces implicated in financialization—including the power, ideology, and institutions mobilized by financial actors—in our analyses. Ethnographers of organizations are ideally positioned to trace the links between these structural forces and everyday processes of technology design, implementation, and use (Anthony, Bechky, & Fayard, 2023). In the following section, we draw on fieldwork at two technology startups to demonstrate how financing models and institutions set the parameters that enable, shape, and constrain processes of sociotechnical change.

### **Going for “Home Runs” at AllDone**

Shestakofsky (2017, forthcoming) conducted fieldwork at an early-stage startup called AllDone (a pseudonym), which ran a digital platform connecting buyers and sellers of local services such as house cleaning, wedding photography, and guitar lessons. AllDone’s organizational practices were shaped by the logic of VC investment, which prioritizes firms that demonstrate their potential to quickly and exponentially inflate their valuation. During an all-office meeting, Josh, AllDone’s product manager, showed a PowerPoint slide explaining that the team would be prioritizing projects that would “send signals to investors and the broader community.” Josh explained that the team’s development decisions would in part be based on the question, “What will a Series B investor want to see? What would they be scared to see?” As Peter, AllDone’s CEO, had

previously explained, to attract a second (Series B) round of VC funding, startups must typically prove not only that they can reach a large audience, but that they also can achieve substantial revenue growth.

Investors' preference for high-risk, high-reward projects motivated team leaders' decisions about which innovations to pursue and which ideas to ignore. One Friday evening, Bill, a software engineer, and Adam, AllDone's director of engineering, stood near their desks as they sipped beers from the office fridge and talked about what Bill should work on when he returned to the office on Monday.

Bill says he wants to test some new features to give sellers more "ownership over their profiles" on the website. Bill speculates that these changes could increase the volume of incoming users referred by satisfied sellers.

Adam responds with skepticism:

AllDone is employing seventeen people [in San Francisco] and nine contractors [in Las Vegas], and it still loses a lot of money. We need a storyline that's compelling from an investment perspective. I don't think the seller [profile] thing is. Search and search-engine marketing is where traffic comes from, not referrals. Direct marketing is how companies make money at scale.

Bill believed that making incremental changes to sellers' profiles would improve their experience on the platform. This would presumably make them more likely to recommend AllDone to others, thereby boosting user growth over time. Adam rejected this logic, arguing that the engineering team should focus only on projects with the potential to demonstrate the massive expansion favored by investors. Bill's idea would not be developed any further.

In highlighting a sociotechnical path not taken, this episode shows how VC does more than simply *support* startups. Instead, it *structures* the startup field, as tech developers feel compelled to act on the signals investors send, while frequently ignoring the needs of other stakeholders in the process—in this case, users (Shestakofsky, forthcoming). The next section illustrates that investors continue to exert pressure as startups mature, though their specific expectations shift.

### **"Growing Up" and Preventing Churn at Chartbeat**

Petre (2018, 2021) conducted six months of ethnographic observation and interviews at Chartbeat, a startup that specialized in creating real-time audience analytics for news organizations. The company's marketing emphasized the fact that, unlike more established generalist tools like Google Analytics, Chartbeat was designed specifically to be used by journalists and editors.

Chartbeat was further along in the startup life cycle than AllDone, having completed its Series B funding round more than a year before Petre's fieldwork began in 2013. Typically, later-stage startups have already demonstrated that they have a viable product with market appeal. Such startups thus focus less on swing-for-the-fences experimentation and more on further growing their customer/user base, refining their

brand, and cementing a dominant market position (DeSantola & Gulati, 2017; Reiff, 2023). Startups aspiring to raise Series C funding are expected to, in the words of one Chartbeat employee, “grow up.”

Just as at AllDone, the VC model affected which projects were prioritized at Chartbeat. Some clients expressed a desire for Chartbeat to offer bespoke consulting that would help newsrooms strategize based on analytics. While there was interest in exploring this option internally, one employee noted that Chartbeat’s status as a VC-funded startup presented an impediment: “Consulting companies don’t raise venture capital . . . ‘cause [if] you’re not a software company, like, there’s no multiplier on your value. It’s just like, okay, we bill 200 bucks an hour.”

While it is well established that the demographic homogeneity of VCs has led the field to invest heavily in some types of consumer tech while ignoring others (e.g., Perez, 2019), this example highlights how VCs’ focus on scale and “value multipliers” produces an almost sole-minded focus on *tech in general*, at the expense of other potential offerings that users might desire. In the case of news analytics, this meant that Chartbeat’s journalist-clients were largely left to their own devices when interpreting Chartbeat’s metrics and acting upon them. This, in turn, often resulted in confusion, internal power struggles, and low morale in newsrooms (Petre, 2021).

In addition to shaping which efforts Chartbeat advanced, the VC model also influenced the design of the company’s existing products. While AllDone was, owing to its earlier stage of development, almost exclusively focused on attracting new users and developing a viable business model, Chartbeat was committed to preventing “churn”—clients canceling their subscriptions—and fending off new competitors. Thus, Chartbeat invested substantial time and resources into building features that would make the analytics tool exciting, even habit-forming, for metrics-averse journalists. These included a dynamic visual display and a speedometer-style dial that tallied a site’s visitors in real time and was purposefully designed to appear maxed out, or “broken,” during moments of exceptionally high site traffic, in order to foster newsroom celebration (Petre, 2021). Although Chartbeat was a later-stage startup, as at AllDone, sociotechnical change was driven by a business strategy informed by investors’ interest in continuing to boost the firm’s valuation.

### Conclusion

The cases of AllDone and Chartbeat illustrate how, in capitalist organizations, financial pressures are filtered down to technology developers in ways that matter for the shape of sociotechnical change. Finance is not the *only* determinative factor—many have demonstrated the importance of local interests and interactions (e.g., Barley, 1986; Callon, 1986). However, the salience of VC logics in decision-making at these two sites points to the importance of centering capital in analyses of sociotechnical change (Shestakofsky, 2020).

Through this examination of VC-funded tech startups, we aim to make a broader point: Structures of capital should be central to studies of sociotechnical change, especially in heavily marketized contexts. This must go beyond simply acknowledging late capitalism as a looming presence. It should extend into tracing how specific funding models shape the organization of work that produces artifacts, as well as the sociotechnical

systems themselves. By examining the material pressures bearing down on processes of sociotechnical change, we can develop a fuller understanding of why they occur as they do, and with what consequences.

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